CLAIMS

What is claimed is:

1. A method comprising:

receiving a data bitstream that includes object-based media information;

associating portions of the object-based media information with a plurality of different transmission priority levels; and

selectively transmitting the portions of the object-based media information over a network that is configured to provide differential services based at least on the plurality of different transmission priority levels.

2. The method as recited in Claim 1, wherein the data bitstream includes object-based media information for a single object.

3. The method as recited in Claim 2, wherein the single object is a video object.

4. The method as recited in Claim 2, wherein the single object is an audio object.

5. The method as recited in Claim 1, wherein associating portions of the object-based media information with the plurality of different transmission priority levels further includes:

placing the portions of the object-based media information in a plurality of data packets, wherein each data packet is associated with a specific transmission priority.

6. The method as recited in Claim 5, wherein at least one of the plurality of data packets includes non-contiguous portions of data from within the data bitstream.

7. The method as recited in Claim 5, wherein selectively transmitting the portions of the object-based media information over the network further includes:

causing the network to selectively halt the transmission of a first data packet carrying object-based media information that is associated with a first priority level prior to halting the transmission of a second data packet carrying object-based media information that is associated with a second priority level prior if the second priority level is higher than the first priority level, should a need arise while transmitting the first and second data packets.

8. The method as recited in Claim 1, wherein the differential services provide different substantially guaranteed Quality of Service (QoS) transmission capabilities for different transmission priority levels.

9. The method as recited in Claim 3, wherein the object-based media information includes a plurality of different types of video frame layers selected from a group that includes Intra (I) coded frame layers, Predicted (P) frame layers, Bi-directionally (B) predicted frame layers, Intra (I) coded frame enhancement layers, Predicted (P) frame enhancement layers, and Bi-directionally (B) predicted frame enhancement layers.

10. The method as recited in Claim 9, wherein associating portions of the object-based media information with the plurality of different transmission priority levels further includes:

setting the transmission priority levels based at least in part on the type of video frame layer.

11. The method as recited in Claim 10, wherein setting the transmission priority levels based at least in part on the type of video frame layer further includes:

causing Intra (I) coded frame layer data to have a higher transmission priority level than Predicted (P) frame layer data;

causing Predicted (P) frame layer data to have a higher transmission priority level than Bi-directionally (B) predicted frame layer data;

causing Bi-directionally (B) predicted frame layer data to have a higher transmission priority level than Intra (I) coded frame enhancement layer data;

causing Intra (I) coded frame enhancement layer data to have a higher transmission priority level than Predicted (P) frame enhancement layer data; and

causing Predicted (P) frame enhancement layer data to have a higher transmission priority level than Bi-directionally (B) predicted frame enhancement layer data.

12. The method as recited in Claim 3, wherein the object-based media information further includes a plurality of different types of video object information selected from a group that includes control information, shape information, motion information and texture information.

13. The method as recited in Claim 12, wherein associating portions of the object-based media information with the plurality of different transmission priority levels further includes:

setting the transmission priority levels based at least in part on the type of video object information.

14. The method as recited in Claim 13, wherein setting the transmission priority levels based at least in part on the type of video object information further includes:

causing at least a portion of the control information to have a higher transmission priority level than at least a portion of the shape information.

15. The method as recited in Claim 13, wherein setting the transmission priority levels based at least in part on the type of video object information further includes:

causing at least a portion of the shape information to have a higher transmission priority level than at least a portion of the motion information.

16. The method as recited in Claim 13, wherein setting the transmission priority levels based at least in part on the type of video object information further includes:

causing at least a portion of the motion information to have a higher transmission priority level than at least a portion of the texture information.

17. The method as recited in Claim 13, wherein setting the transmission priority levels based at least in part on the type of video object information further includes:

causing at least a portion of the texture information to have a higher transmission priority level than at least a portion of the shape information.

18. The method as recited in Claim 3, wherein:

the object-based media information includes a plurality of different types of video frame layers selected from a group that includes Intra (I) coded frame layers, Predicted (P) frame layers, Bi-directionally (B) predicted frame layers, Intra (I) coded frame enhancement layers, Predicted (P) frame enhancement layers, and Bi-directionally (B) predicted frame enhancement layers;

the object-based media information further includes a plurality of different types of video object information selected from a group that includes control information, shape information, motion information and texture information; and

wherein associating portions of the object-based media information with the plurality of different transmission priority levels further includes setting the transmission priority levels based at least in part on the type of video frame layer and the type of video object information.

19. The method as recited in Claim 18, wherein setting the transmission priority levels based at least in part on the type of video frame layer and the type of video object information further includes:

setting control information to a class 0 transmission priority level;

setting shape information and texture DC information of at least one Intra (I) coded frame layer to a class 1 transmission priority level;

setting texture AC information of the Intra (I) coded frame base layer to a class 2 transmission priority level;

setting shape information and motion information of at least one Predicted (P) frame layer to a class 3 transmission priority level;

setting texture information of the Predicted (P) frame layer to a class 4 transmission priority level; and

setting shape information, motion information and texture information of at least one Bi-directionally (B) predicted frame base layer to a class 5 transmission priority level, and

wherein the class 0 transmission priority level is higher than the class 1 transmission priority level, the class 1 transmission priority level is higher than the class 2 transmission priority level, the class 2 transmission priority level is higher than the class 3 transmission priority level, the class 3 transmission priority level is higher than the class 4 transmission priority level, and the class 4 transmission priority level is higher than the class 5 transmission priority level.

20. The method as recited in Claim 1, further comprising:

receiving at least one down-stream preference with regard to the object-based media information; and

selectively transmitting at least one of the portions of the object-based media information over the network based on the down-stream preference.

21 ~~22~~. The method as recited in Claim 1, further comprising:

receiving at least one down-stream preference with regard to the object-based media information; and

selectively halting the transmission of at least one of the portions of the object-based media information over the network based on the down-stream preference.

22 ~~23~~. The method as recited in Claim 1, wherein the data bitstream includes MPEG-4 encoded video data.

23 ~~24~~. The method as recited in Claim 1, wherein the network is an Internet Protocol (IP) based network.

24 ~~25~~. An arrangement comprising:

a server device configured to provide a data bitstream that includes object-based media information having portions of the object-based media information associated with a plurality of different transmission priority levels;

at least one client device; and

at least one communication network operatively coupled between the server device and the client device, the communication network being configured to provide selective differential services based at least on the plurality of different transmission priority levels of the portions of the object-based media information.

25 ~~26~~. The arrangement as recited in Claim 25, wherein the data bitstream includes object-based media information for a single object.

26 ~~27~~. The arrangement as recited in Claim 26, wherein the single object is a video object.

27 ~~28~~. The arrangement as recited in Claim 26, wherein the single object is an audio object.

28 ~~29~~. The arrangement as recited in Claim 25, wherein the server device is further configured to place the portions of the object-based media information in a plurality of data packets, wherein each data packet is associated with a specific transmission priority.

29~~30~~. The arrangement as recited in Claim 29, wherein at least one of the plurality of data packets includes non-contiguous portions of data from within the data bitstream.

30~~31~~. The arrangement as recited in Claim 29, wherein the communication network is further configured to selectively halt the transmission of a first data packet carrying object-based media information that is associated with a first priority level prior to halting the transmission of a second data packet carrying object-based media information that is associated with a second priority level prior if the second priority level is higher than the first priority level, should a need arise while transmitting the first and second data packets.

31~~32~~. The arrangement as recited in Claim 25, wherein the selective differential services provide different substantially guaranteed Quality of Service (QoS) transmission capabilities for different transmission priority levels.

32~~33~~. The arrangement as recited in Claim 27, wherein the object-based media information includes a plurality of different types of video frame layers selected from a group that includes Intra (I) coded frame layers, Predicted (P) frame layers, Bi-directionally (B) predicted frame layers, Intra (I) coded frame enhancement layers, Predicted (P) frame enhancement layers, and Bi-directionally (B) predicted frame enhancement layers.

33 ~~34.~~ The arrangement as recited in Claim 33, wherein the server device is further configured to set the transmission priority levels based at least in part on the type of video frame layer.

34 ~~35.~~ The arrangement as recited in Claim 34, wherein the server device is further configured to:

set Intra (I) coded frame layer data to a higher transmission priority level than Predicted (P) frame layer data;

set Predicted (P) frame layer data to a higher transmission priority level than Bi-directionally (B) predicted frame layer data;

set Bi-directionally (B) predicted frame layer data to a higher transmission priority level than Intra (I) coded frame enhancement layer data;

set Intra (I) coded frame enhancement layer data to a higher transmission priority level than Predicted (P) frame enhancement layer data; and

set Predicted (P) frame enhancement layer data to a higher transmission priority level than Bi-directionally (B) predicted frame enhancement layer data.

35 ~~36.~~ The arrangement as recited in Claim 27, wherein the object-based media information further includes a plurality of different types of video object information selected from a group that includes control information, shape information, motion information and texture information.

36 ~~37.~~ The arrangement as recited in Claim 36, wherein the server device is further configured to set the transmission priority levels based at least in part on the type of video object information.

37 ~~38.~~ The arrangement as recited in Claim 37, wherein the server device is further configured to set at least a portion of the control information to a higher transmission priority level than at least a portion of the shape information.

38 ~~39.~~ The arrangement as recited in Claim 37, wherein the server device is further configured to set at least a portion of the shape information to a higher transmission priority level than at least a portion of the motion information.

39 ~~40.~~ The arrangement as recited in Claim 37, wherein the server device is further configured to set at least a portion of the motion information to a higher transmission priority level than at least a portion of the texture information.

40 ~~41.~~ The arrangement as recited in Claim 37, wherein the server device is further configured to set at least a portion of the texture information to a higher transmission priority level than at least a portion of the shape information.

41 ~~42.~~ The arrangement as recited in Claim 27, wherein:

the object-based media information includes a plurality of different types of video frame layers selected from a group that includes Intra (I) coded frame layers, Predicted (P) frame layers, Bi-directionally (B) predicted frame layers, Intra (I)

coded frame enhancement layers, Predicted (P) frame enhancement layers, and Bi-directionally (B) predicted frame enhancement layers;

the object-based media information further includes a plurality of different types of video object information selected from a group that includes control information, shape information, motion information and texture information; and

wherein the server device is further configured to set the transmission priority levels based at least in part on the type of video frame layer and the type of video object information.

42 ~~43.~~ The arrangement as recited in Claim 42, wherein the server device is further configured to:

set control information to a class 0 transmission priority level;

set shape information and texture DC information of at least one Intra (I) coded frame layer to a class 1 transmission priority level;

set texture AC information of the Intra (I) coded frame base layer to a class 2 transmission priority level;

set shape information and motion information of at least one Predicted (P) frame layer to a class 3 transmission priority level;

set texture information of the Predicted (P) frame layer to a class 4 transmission priority level; and

set shape information, motion information and texture information of at least one Bi-directionally (B) predicted frame base layer to a class 5 transmission priority level, and

where the class 0 transmission priority level is higher than the class 1 transmission priority level, the class 1 transmission priority level is higher than the class 2 transmission priority level, the class 2 transmission priority level is higher than the class 3 transmission priority level, the class 3 transmission priority level is higher than the class 4 transmission priority level, and the class 4 transmission priority level is higher than the class 5 transmission priority level.

43 ~~44.~~ The arrangement as recited in Claim 25, wherein the network is further configured to:

receive at least one down-stream preference generated within the communication network or by the client device with regard to the object-based media information; and

selectively transmit at least one of the portions of the object-based media information based on the down-stream preference.

44 ~~45.~~ The arrangement as recited in Claim 25, wherein the network is further configured to:

receive at least one down-stream preference generated within the communication network or by the client device with regard to the object-based media information; and

selectively halt the transmission at least one of the portions of the object-based media information based on the down-stream preference.

45 ~~46.~~ The arrangement as recited in Claim 25, wherein the data bitstream includes MPEG-4 encoded video data.

46 ~~47~~. The arrangement as recited in Claim 25, wherein the network is an Internet Protocol (IP) based network.

47 ~~48~~. A method for use in a communications node within a network, the method comprising:

receiving data that includes object-based media information that is packetized according to different transmission priority levels; and

selectively outputting the portions of the object-based media information based at least on the plurality of different transmission priority levels.

48 ~~49~~. The method as recited in Claim 48, wherein the data bitstream includes object-based media information for a single video object.

49 ~~50~~. The method as recited in Claim 48, wherein the data bitstream includes object-based media information for a single audio object.

50 ~~51~~. The method as recited in Claim 48, wherein the communication node is configured to support differential services that provide different substantially guaranteed Quality of Service (QoS) transmission capabilities for the different transmission priority levels.

51 ~~52.~~ The method as recited in Claim 48, wherein the object-based media information includes a plurality of different types of video frame layers selected from a group that includes Intra (I) coded frame layers, Predicted (P) frame layers, Bi-directionally (B) predicted frame layers, Intra (I) coded frame enhancement layers, Predicted (P) frame enhancement layers, and Bi-directionally (B) predicted frame enhancement layers.

52 ~~53.~~ The method as recited in Claim 52, wherein the received data is packetized according to different transmission priority levels based at least in part on the type of video frame layer.

53 ~~54.~~ The method as recited in Claim 53, wherein, within the received data, at least one of the following statements is true:

the Intra (I) coded frame layer data has a higher transmission priority level than Predicted (P) frame layer data;

the Predicted (P) frame layer data has a higher transmission priority level than Bi-directionally (B) predicted frame layer data;

the Bi-directionally (B) predicted frame layer data has a higher transmission priority level than Intra (I) coded frame enhancement layer data;

the Intra (I) coded frame enhancement layer data has a higher transmission priority level than Predicted (P) frame enhancement layer data; and

the Predicted (P) frame enhancement layer data has a higher transmission priority level than Bi-directionally (B) predicted frame enhancement layer data.

54 ~~55.~~ The method as recited in Claim 48, wherein the object-based media information further includes a plurality of different types of video object information selected from a group that includes control information, shape information, motion information and texture information.

55 ~~56.~~ The method as recited in Claim 55, wherein the received data is packetized according to different transmission priority levels based at least in part on the type of video object information.

56 ~~57.~~ The method as recited in Claim 56, wherein at least a portion of the control information has a higher transmission priority level than at least a portion of the shape information.

57 ~~58.~~ The method as recited in Claim 56, wherein at least a portion of the shape information has a higher transmission priority level than at least a portion of the motion information.

58 ~~59.~~ The method as recited in Claim 56, wherein at least a portion of the motion information has a higher transmission priority level than at least a portion of the texture information.

59 ~~60.~~ The method as recited in Claim 56, wherein at least a portion of the texture information has a higher transmission priority level than at least a portion of the shape information.

60 ~~61.~~ The method as recited in Claim 48, wherein:

the object-based media information includes a plurality of different types of video frame layers selected from a group that includes Intra (I) coded frame layers, Predicted (P) frame layers, Bi-directionally (B) predicted frame layers, Intra (I) coded frame enhancement layers, Predicted (P) frame enhancement layers, and Bi-directionally (B) predicted frame enhancement layers;

the object-based media information further includes a plurality of different types of video object information selected from a group that includes control information, shape information, motion information and texture information; and

wherein the received data is packetized according to different transmission priority levels based at least in part on the type of video frame layer and the type of video object information.

61 ~~62.~~ The method as recited in Claim 61, wherein:

control information has a class 0 transmission priority level;

shape information and texture DC information of at least one Intra (I) coded frame layer each have a class 1 transmission priority level;

texture AC information of the Intra (I) coded frame base layer has a class 2 transmission priority level;

shape information and motion information of at least one Predicted (P) frame layer each have a class 3 transmission priority level;

texture information of the Predicted (P) frame layer has a class 4 transmission priority level; and

shape information, motion information and texture information of at least one Bi-directionally (B) predicted frame base layer each have a class 5 transmission priority level, and

wherein the class 0 transmission priority level is higher than the class 1 transmission priority level, the class 1 transmission priority level is higher than the class 2 transmission priority level, the class 2 transmission priority level is higher than the class 3 transmission priority level, the class 3 transmission priority level is higher than the class 4 transmission priority level, and the class 4 transmission priority level is higher than the class 5 transmission priority level.

62 ~~63.~~ The method as recited in Claim 48, further comprising:

receiving at least one down-stream preference with regard to the object-based media information; and

selectively outputting at least one of the portions of the object-based media information based on the down-stream preference.

63 ~~64.~~ The method as recited in Claim 48, wherein the received data includes MPEG-4 encoded video data.

64 ~~65.~~ The method as recited in Claim 48, wherein the received data includes Internet Protocol (IP) data.

65 ~~66.~~ A system comprising:

at least one client device configured to receive prioritized video object-based data packets and output control requests relating to a video object;

at least one server device configured to output prioritized object-based data packets representing the video object, the prioritized object-based data packets being prioritized based at least on part on the type of data as selected from a group comprising control data, shape data, motion data, and texture data; and

at least one video transmission agent (VTA) coupled to receive the prioritized object-based data packets from the server device and the control requests from the client device, and to selectively output at least a portion of the received prioritized object-based data packets to the client device based in response to the control requests.

~~67~~ 66. The system as recited in Claim 66, further comprising:

a network operatively coupled between the server device and the client device, and wherein the video transmission agent (VTA) is operatively configured within the network.

~~68~~ 67. The system as recited in Claim 67, wherein the network is further configured to provide differential services to the prioritized object-based data packets, such that prioritized object-based data packets having lower priority levels are selectively dropped should the network become congested.

~~69~~ 68. A computer-readable medium having a data structure, comprising:

a first field containing identifying data associated with a portion of a data bitstream that represents a video object;

at least one second field that is derived from the first field and includes data representing object-based video information for the video object that has been

classified as having a specific transmission priority level based on at least one type of object-based video information selected from a group comprising control information, shape information, motion information, and texture information.

69 ~~70.~~ The computer-readable medium having a data structure as recited in Claim 69, further comprising:

a third field containing identifying data associated with the specific transmission priority level of the data in the second field.

70 ~~71.~~ A computer-readable medium having computer-executable instructions for performing the steps recited in Claim 1.

71 ~~72.~~ A computer-readable medium having computer-executable instructions for performing the steps recited in Claim 48.